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SHELL COLLECTING IN WEST CENTRAL AMERICA

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On this my third consecutive winter collecting expedition in west coast ports below our southern border, the first stop was Champerico, Guatemala.

All passengers and baggage landed here have to be lowered over the side of the large steamer to small boats, from which you are again hoisted to a rickety old pier and a tiny narrow gage railway which runs to the Capital.

The coast line looked anything but favorable to a conchologist so I decided to spend the next week visiting the points of interest in the interior and going on by rail to La Union, Salvador, on the Gulf of Fonseca. A new rail connection has just been finished between Guatemala City and San Salvador by which it is now possible to go by rail the entire distance from the U. S. A. to the Gulf of Fonseca. Tagucigalpa in Honduras is now the only Central American capital not to be reached by railroad.

The Champerico coast is a long line of white surf on an endless stretch of black sand beach as far as the eye can reach. I was told that the next three ports below here are similar open roadsteads. If one were here immediately after a storm there might be some luck, but at other times nothing.

La Union, a little town of some five thousand inhabitants, is one of the principal coffee ports in Central America. The coast line here at low tide is a vast expanse of mud flats where the native women and children wade at low tide in search of things edible for the soup pot. The family pigs follow along, also searching out marine delicacies. The *Modiolus guyanen-*

sis Lam. burrows separately in the mud but the smaller *Modiolus mutabilis* Cpr. lives in great masses thirty feet or more across, raised above the surrounding flats, thus furnishing excellent foraging for the hogs at extreme low water.

For two days, during my stay, a stiff northerly wind blew, the last day so bad that the tri-weekly launch from Amapala could not land but had to ride out the storm all that day and night. At the first low tide after, the beach yielded a plentiful assortment of *Modiolus*, *Dosinia*, several species of *Venus* and *Callista* and two species of the lovely red *Tellinas* and other occasional rarities.

The hotel cook for a small "propina" kindly boiled all my shells for me, and after a thorough cleaning, dried them in the hot sunshine in the patio.

The large black and white *Columbella rugosa* Sby. seemed to be very abundant everywhere, but at extreme low tide a few species of rare gastropods could occasionally be found under stones on the mud flats. An interesting species of *Crepidula* was found living on *Modiolus guyanensis* Lam. taking form and color from its host. Chitons and Cypraea were conspicuous by their absence.

Returning one day from "Isla Perico" my boatman rowed me through the mangrove-lined river passage. Here we passed literally acres of bars covered with oysters, all dead, evidently killed by fresh water floods. *Arca tuberculosa* Rve. is very abundant here; all through the mangrove swamps, the snapping together of the valves is plainly heard as one rows along. They are much used for food by the native population, being called *coriles* here, and in Nicaragua by the name *tuchia*. They are eaten raw, like oysters, with lime juice, but the dark mahogany color of the flesh did not look appetizing to me.

At the end of ten days the full moon tides were over and my specimens in condition to send through the mail, so I took the first steamer for Corinto.

Here in place of mud flats were miles of white sand beach. A few pairs of fine *Macra* and other bivalves came ashore here. I had quite a thrill at collecting my first *Agaronia*

testacea Lk. plowing through the sand at low water in company with the chocolate colored *Terebra luctuosa* Hds. and the sportive little banded *Olivella columellaris* Sby., which, instead of the usual slow gait of that genus, had the jumping movements of a trained seal, usually burying itself in the sand between each wave, leaving only the two spreading tentacles protruding. On one of the best tides, I took a "cayuca" with two native rowers to the Isla Cordon, the island at the entrance to the bay, on which is the lighthouse.

Here I had thrill number two in finding my first live *Siphonaria characteristica*. I supposed I was finding *S. gigas* Sby., but that species did not turn up till Panama, and at no place did I find any intergrades of the two species. Although not a rare species it is so beautiful that one wants to take all in sight until you find that quite impossible, both as to location and tide.

The large *Purpura crassa* Blv. with its beautiful purple stained columella put in its first appearance here. On the mud flats across the bay from town were great colonies of *Olivella volutella* Lk. in six distinct beautiful color forms.

Corinto had about the fewest species of any of the ports visited. After a busy ten days of collecting, I took the train for Granada, that picturesque old Spanish town on the shores of Lake Nicaragua. On returning stopped at her ancient rival Leon and the newer capital Managua, beautifully located on the lake of that name, which in two short weeks after my visit was to be utterly destroyed.

San Juan del Sur the next port south, a picturesque little town, snuggles on one side of beautiful San Juan Bay, palm fringed and hill surrounded. It has the quaint smoky kerosene street lamps and other luxuries of a by-gone period. Water for domestic use is carried into the houses, likewise the bath tubs.

I had an upstairs room at the house of the Comandante with balconies on front and back where I could dry my shells. I soon found the roof to be well populated with sportive tropical rats, which at night seemed to enjoy playing rat billiards with my cypraeas and cones trying to see how many

they could roll down the knot-holes in the floor. Sometimes I would find them half way down the back stairs or rolled under the bed.

One of the redeeming features of the place, however, were the meals, for the Comandante's wife had learned to cook in American style, while on a visit to California.

The day I landed, and for six days following, a stiff north wind howled through the town night and day; it seemed as though the houses would surely all lose their corrugated iron roofs. At last the wind subsided and the balance of my stay was simply perfect. The beach was well supplied with colonies of *Olivella columellaris* Sby. in two color forms, a yellow one which was rather rare; also quite a few *agaronia testacea* Lk.; I took three specimens of a beautiful orange color, like *Cypraea aurantia*.

While collecting them at low tide I noticed to my surprise that before drawing within the shell each individual cast off the posterior part of the foot, about one-third of the entire length. Otherwise the animal could not entirely withdraw into the shell. The species has no operculum. The portion of the foot which it is possible for the mollusk to cast off, is clearly defined by a line of separation on the under side and is actually attached by a mere thread. The detached portion pulsed with life for several minutes after being separated.

On the further side of the bay were plenty of *Siphonaria characteristica*, *Columbella*, and several species of chitons. *Columbella labiosa* Sby., to my amazement, clung to the sides of exposed rocks like *Thais*, and the *Columbella rugosa* Sby. were sitting around everywhere on top of the rocks, not underneath where most of the genus are supposed to live.

The next bay to the north, "Nacas Colo", proved the most profitable collecting ground. In going there every day I had to pass a huge rubber tree on the edge of the clearing where a large colony of white-faced monkeys had their home. At sight of me they always started a great chattering, wondering, I suppose, at the queer human creature who picked up many shells (*Siphonarias*) only to throw away the nice juicy animals and keep the useless "conchas".

On the further side of Nacas Colo where the rocks and sand beach meet, I took some fine live *Vasum coestum* Brod. and *Murex regius* in the sand between the rocks; and on top and sides of these same rocks, in much the same location as our *Murex trialatus* in California, was a small colony of the extremely rare *Murex oxycantha* Brod., the young shells quite free from incrustations. This was one of my best finds as I had never taken but one of these before and that was a badly incrustated specimen at Mazatlan.

While digging for bivalves in the clam beds among a mixture of small stones and sandy mud, I was much surprised to find a *Sigaretus* with brick red body about six inches in length, of course completely enveloping the beautiful brown shell.

Although I offered my native companion a peso each, he was unable to unearth another one, although he set his whole family to digging next day.

On my second visit to Nacas Colo, I explored the near side of the bay. It was the lowest of the February tides and was running out fast, exposing parts of the beach not seen before. When about half way to the outer point, I noticed in a little sheltered cove what seemed to be masses of white foam floating on the water. By the time I had reached the spot I found quite a coral reef exposed so that I could wade out and search for mollusks. Here I took my first living *Coraliophilla madreporarum* Sby. I had taken dead shells at both Tres Marias and Acapulco last year. I had a small iron bar with me and must have smashed up a good wagon load of coral before the incoming tide put a stop to operations. A number of beautiful living specimens of *Cypraea arabicula* Lk. and *Pustularia pustulata* were found underneath the coral masses. The latter species was much larger though paler in color than those found under rocks. The *coraliophila* were almost always clinging to the large inside stems of the coral which necessitated careful search of the broken fragments.

San Juan del Sur was one of the richest collecting grounds I have found on the entire coast. Many small treasures would occasionally turn up such as *Murex erosus* Brod.; *Murex*

obeliscus Ads.; *Murex radiatus* Ads.; *Bursa callata* Brod., and several Tritons, with their thick fur overcoats, would be taken alive at times.

The natives poetically refer to the coral as "los flores del mar" or flowers of the sea; they gather nice specimens and tint them with all colors like Joseph's coat. They brought some around to the Comandancia expecting me to buy some of their weird concoctions. They wanted eighty cents from the American but the comandante's wife finally bought the largest piece for fifteen cents, and it proudly adorns the center table in the *sala* today.

Many of the natives had been telling me what quantities of fine shells there were at Santa Elena Bay, so to satisfy my curiosity, we fitted out for a two-day expedition with the large cabin launch "Chumba". There were sixteen in the party all told, and everyone slept on deck that night except three who went out hunting deer and tapir.

As Sta. Elena is just inside the Costa Rica border we had to stop at a small port, Las Cruces, on the frontier to obtain permission to land. We had the Comandante of San Juan with us and the Comandante of Las Cruces came along also to enjoy the fishing.

At Las Cruces, in getting back on the launch, I and my camera went overboard. After being fished out, I dried myself on deck in the hot sunshine but the poor camera had shipped some salt water in the shutter and refused to work the rest of the trip, besides losing a roll of irreplaceable film.

We did a lot of trolling on the way over with excellent results in large fish. We arrived at our destination just about dark and some of the men went ashore to clean the large catch of fish which were salted and dried next morning. By daylight we were all ready to go ashore. The tide was out early and exposed large mud and sand flats at the upper end of the bay where we were anchored.

That morning I took my first living *Strombus galeatus* Sby. which were plowing along through the mud at extreme tide. Across the river mouth were rich clam flats where some of the men dug enough *Venus subrugosa* Sby. for a

meal and others took a whole barley sack full of *Arca tuberculosa* Sby. in the mangroves bordering the river. I took some of the most beautiful color patterns of *Tapes grata* Say I have ever seen. Feeding on the bivalves were many *Murex regius* Wood, often three of the younger ones trying to open the same *Dosinia*. That morning I took my only living specimens of *Fasciolaria granosa* Brod. and they were beauties too. It seems to be a very rare species all along the coast, even dead shells are rarely seen.

Two days later I had all my Nicaraguan catch cleaned and dried, and I fairly swamped the little San Juan Post Office with packages. After sixteen very pleasant and profitable days at this Nicaraguan port I left for Puntarenas, Costa Rica.

Puntarenas as its name indicates lies on a long sand spit in the Gulf of Nicoya. The inner bay or *Estero* gives anchorage for small craft and river boats which bring down cattle and much valuable hardwood timber from the inland forests. The shore is lined with saw-mills.

The outer side of the peninsula has a fine new steel pier just completed, where the larger steamers land. At extreme low water, many large sand bars make their appearance in the inner bay, each one seeming to have some particular species not found on the others. On one small bar were the only living *Potamides pacificum* taken on the whole trip. On the largest bar at the mouth of the channel I found some giant *Melongena patula* completely in the mud, at another place was a large school of *Conus mahogani* Rve. and at the extreme end fine *Conus*. Many fine color forms of *Olivella volutella* Lk. and an occasional live *Cassis abbreviatus* Lk. and *Dolium ringens* Sby. plowing through the sand. I was surprised to find *Dolium* living on sand flats when at Mazatlan I had taken them in ledges of rock inhabited by *Patella mexicana* Sby. in open wave-beaten locations.

Puntarenas seems to be the metropolis for *Arca grandis*, for I have never seen them in such abundance or size anywhere else—occasionally large pairs would be found which would weigh several pounds each. Great heaps of the shells

would be found back of every hotel and restaurant along the water front. The fishermen gather them at low tide on the sand bars in the bay and keep them in beds between tides ready for use at any time. Many families have large areas paved with the shells on which to dry their laundry in the hot sun. A double row of the shells set in the edge of the cement walks in front of some of the better homes would often be seen. In some parts of the bay were large bars studded with pairs of *Pinna*, but not a living specimen! Evidently they had been killed out by fresh water mud, for on attempting to set foot on these seemingly solid bars, one would sink to the knees in soft ooze, the broken shells cutting one's flesh, making landing next to impossible.

I chartered a launch with crew of three men to cruise the upper part of the Gulf of Nicoya and some of the islands. The collecting as a whole was not what might be expected as the tides were not sufficiently low, but nevertheless a few rarities in bivalves turned up. On the edges of the mangrove swamps I took the finest *Littorina pulchra* (well named!) I had ever seen. They were as large as strawberries and were up as high as my head on the mangrove trees. They were not very plentiful and travel through mangrove swamps is not the best going. On one island the cook gathered a bucket of large *Neritas* and that evening we had *Neritas* fried with black beans and white rice and were not so bad when one is hungry—the *Neritas* were rather tough, however. The natives refer to beans and rice cooked together as *Moros y Cristianos*. Quite expressive!

After two weeks of Puntarenas I went by rail to the capital for a few days to cool off in the higher altitude. At San Juan one sleeps under a blanket, while on the coast a sheet is too much.

The third day after reaching Panama, I started out to explore the Montijo Bay country about two hundred miles north. I am sure that sometimes it is well that we do not foresee the days, inconveniences and obstacles incidental to a certain anticipated trip or we probably would not take it. I was rewarded, however, with some of the best collecting of

the winter. Suffice it to say that I left Panama on a Wednesday morning and did not reach Mariato till Saturday midnight. The latter part of the trip was made by launch down the tidal river San Pablo into the Bay of Montijo and almost everything seemed to happen to enliven the trip, from breaking the rudder to running aground on a sand bar, in the black moonless night, opposite Tres Islas.

At Mariato I had very comfortable quarters on the coconut plantation and had a horse at my disposal every day. The upper reaches of the bay are simply endless miles of mangrove swamps, but after passing the river Suai the coast line gradually changes to mud flats, sandy mud, then clear sand beach with many *Olivella* and numerous bivalves. About three miles further a long reef of shelving rock runs out a good half mile from shore, the outer part is only accessible at the lowest tides of the year for an hour or so, as the tides of twenty feet or more run in very rapidly once they have turned. I made daily trips to this reef for five days and while my horse dozed in the shade of a tree by the beach, his master turned literally tons of rocks and was well rewarded by lovely *Cypraea*, *Cones*, *Mitra*, *Cardita*, *Murex* and *Triton*, in no great quantity, but enough to keep up one's enthusiasm.

Once more I had to thank the hermit crabs for some of my rarest species—much like the location in Mazatlan where I had such good luck two years ago, a small bunch of small rocks on the edge of the mud flats yielded three species of *Cancellaria* and several *Pleurotomas*, *Terebas*, etc., all of which I had dredged in deep water off the Mexican coast. Some of them were as fresh and perfect as living shells.

As the tides were over I reluctantly bade farewell to Mariato and after a trip of two days and two nights by dug-out canoe, on foot, on horseback and lastly by autostage, I finally reached Panama and civilization once more. Two days later I left for Taboga Island, reputed to be very rich in molluscan life. During my nine days' stay, there were the full moon tides of April which were extremely good. I worked diligently every day turning over tons of rock and coral both there and on Taboguilla and I must say that at

times no doubt Taboga is very rich but during my stay it was the poorest collecting, regards number of species, of any place I have visited on the coast of Central America.

My dredging this trip has been rather a failure. At La Union I was unable to secure a launch. At Corinto I had the Pilot's boat two mornings with fair success. At San Juan del Sur after the third haul we lost the dredge completely and had to have another one made after much difficulty.

At Puntarenas I could not find any suitable dredging ground; too much mud.

At Taboga, the very opposite, coarse gravel but no shells—the gravel so coarse in fact it would not wash through the dredge net. At a small island between Taboga and the mainland we made a few hauls with mostly live *Pecten circularis* as results. These seem to come into shallow water only at certain seasons of the year—probably at spawning time.

The *Cypraea arabicula*, *Ranella caelata* and several *Thais* were all spawning on the rocks at this season.

NEW LAND SNAILS FROM IDAHO AND EASTERN OREGON

BY H. BURRINGTON BAKER

Among the species collected in the Idaho Transition-Area during the summer of 1931, the following appear to be new: *Anguispira nimapuna* and *Discus* (*Gonyodiscus*) *marmorensis* from Idaho and *Megomphix lutarius* from eastern Oregon. Arguments are presented to show that the generic term *Discus* should take preference over the more familiar *Gonyodiscus*. Types are in the Academy of Natural Sciences of Philadelphia.

ANGUISPIRA NIMAPUNA, new species. Plate 5, figs. 4 to 6.

Type locality near northeast corner of section 32, T. 32 N., R. 4 E. (Boise Meridian) at about 116° W. Long. and 46° 5' N. Lat.; quite common in a small, shallow, lava rock-slide near bottom (altitude about 1,350 feet) of southwest-facing